

WHAT IS CLAIMED IS:

1. A semiconductor device, comprising:  
a substrate;  
a base oxide film provided on the substrate;  
5 a plurality of signal lines;  
short-circuit wiring provided on the base oxide film that electrically connects the plurality of signal lines during a manufacturing process;  
an insulating film covering the short-circuit wiring comprising a hole formed by etching that cuts the short-circuit wiring to release the signal lines from a  
10 short-circuit state; and  
an etching stop layer comprising a film having resistance to etching of an oxide film formed on a surface of the short-circuit wiring provided between the short-circuit wiring and the base oxide film in a region wider than at least the hole.

15 2. The semiconductor device according to claim 1, the etching stop layer comprising an arbitrary film located in a layer below the short-circuit wiring and used at positions other than formation positions of the short-circuit wiring in the semiconductor device.

20 3. An electro-optical device substrate constituting one of a pair of substrates of an electro-optical device having an electro-optical material held between the pair of substrates, the electro-optical device substrate comprising:  
a substrate;  
a base oxide film provided on the substrate;  
a plurality of signal lines;  
short-circuit wiring provided on the base oxide film that electrically  
25 connects the plurality of signal lines during a manufacturing process;  
an insulating film covering the short-circuit wiring comprising a hole formed by etching that cuts the short-circuit wiring to release the signal lines from a short-circuit state; and  
an etching stop layer comprising a film having resistance to etching of an oxide film formed on a surface of the short-circuit wiring provided between the short-circuit wiring and the base oxide film in a region wider than at least the hole.

30 4. The electro-optical device substrate according to claim 3, the etching stop layer comprising an arbitrary film located in a layer below the short-circuit

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wiring and used at positions other than formation positions of the short-circuit wiring in the electro-optical device substrate.

5. A liquid crystal device substrate constituting one of a pair of substrates of a liquid crystal device having a liquid crystal held between the pair of substrates,

5 the liquid crystal device substrate comprising:

a substrate;

a base oxide film provided on the substrate;

a plurality of signal lines;

short-circuit wiring provided on the base oxide film that electrically connects the plurality of signal lines during a manufacturing process;

10 an insulating film covering the short-circuit wiring comprising a hole formed by etching that cuts the short-circuit wiring to release the signal lines from a short-circuit state; and

15 an etching stop layer comprising a film having resistance to etching of an oxide film formed on a surface of the short-circuit wiring provided between the short-circuit wiring and the base oxide film in a region wider than at least the hole.

6. The liquid crystal device substrate according to claim 5, the etching stop layer comprising an arbitrary film located in layer below the short-circuit wiring and used at positions other than formation positions of the short-circuit wiring in the liquid crystal device substrate.

20 7. The liquid crystal device substrate according to claim 6, further comprising thin film transistors, each transistor comprising a silicon film as a semiconductor active film, the etching stop layer comprising the silicon film in a same layer as the semiconductor active films, and the short-circuit wiring being made of a gate electrode material for the thin film transistors.

8. The liquid crystal device substrate according to claim 7, further comprising an insulating film constituting the silicon film of the thin film transistors and interposed between the short-circuit wiring and the etching stop layer.

25 9. The liquid crystal device substrate according to claim 7, the silicon film being a single crystal silicon film.

10. The liquid crystal device substrate according to claim 9, the substrate, the base oxide film and the single crystal silicon film being formed using, as a raw

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material substrate, a bonding SOI substrate having a bonding interface between the substrate and the base oxide film.

11. The liquid crystal device substrate according to claim 5, a portion of the signal lines comprising a wiring layer different from the short-circuit wiring, and the signal lines and the short-circuit wiring being electrically connected through contact holes passing through an insulating film interposed between the signal lines and the short-circuit wiring.

5 12. A liquid crystal device, comprising:

a pair of substrates; and

10 a liquid crystal held between the pair of substrates, at least one of the pair of substrates comprising the liquid crystal device substrate according to claim 5.

13. A projection liquid crystal display, comprising:

the liquid crystal device according to claim 12 as a light valve, light emitted from a light source being modulated by the liquid crystal device; and

15 a projection optical device, the modulated light being enlarged and projected on a projection screen by the projection optical device.

14. An electronic apparatus comprising the liquid crystal device according to claim 12.

15. A method of manufacturing a liquid crystal device substrate constituting one of a pair of substrates of a liquid crystal device having a liquid crystal held between the pair of substrates, the liquid crystal device substrate comprising a substrate, a base oxide film provided on the substrate, a plurality of signal lines, and short-circuit wiring provided on the base oxide film for electrically connecting the plurality of signal lines during a manufacturing process, the method comprising the steps of:

20 forming, on the base oxide film, an etching stop layer comprising a film having resistance to etching of an oxide film formed on the short-circuit wiring;

forming the short-circuit wiring on the base oxide film so that the short-circuit wiring crosses the etching stop layer;

25 forming an insulating film to cover the short-circuit wiring;

forming holes by etching in the insulating film above a formation region of the etching stop layer, for cutting the short-circuit wiring to release the signal lines from a short-circuit state;

etching out the oxide film formed on the short-circuit wiring through the holes; and

cutting the short-circuit wiring through the holes.

16. The method of manufacturing a liquid crystal device substrate according to claim 15, the etching stop layer being formed before formation of the short-circuit wiring, and comprising an arbitrary film used at positions other than formation positions of the short-circuit wiring in the liquid crystal device substrate.

17. A method of manufacturing a liquid crystal device substrate constituting one of a pair of substrates of a liquid crystal device having a liquid crystal held between the pair of substrates, the liquid crystal device substrate comprising a substrate, a base oxide film provided on the substrate, a plurality of signal lines, a plurality of pixel electrodes respectively connected to the plurality of signal lines, short-circuit wiring provided on the base oxide film for electrically connecting the plurality of signal lines during a manufacturing process, and thin film transistors each comprising a silicon film as a semiconductor active film; the method comprising the steps of:

20 patterning a silicon film on the base oxide film to form the semiconductor active films of the thin film transistors and to form an etching stop layer having resistance to etching of a silicon oxide film;

forming a silicon oxide film on the silicon film remaining;

depositing a gate electrode material film for the thin film transistors over an entire surface and patterning it to form scanning lines which constitute the signal lines, gate electrodes of the thin film transistors, and the short-circuit wiring which crosses the etching stop layer;

25 introducing an impurity into the semiconductor active films of the thin film transistors to form source regions and drain regions;

forming a first interlayer insulating film to cover the thin film transistors and the short-circuit wiring;

30 patterning the first interlayer insulating film to form source contact holes which pass through the first interlayer insulating film and reach the source regions of the thin film transistors;

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depositing a conductive film and patterning it to form data lines which constitute the signal lines electrically connected to the source regions through the source contact holes, and form terminals;

5 forming a second interlayer insulating film to cover the data lines and the terminals;

10 patterning the second interlayer insulating film and the first interlayer insulating film to form drain contact holes which pass through both of the first interlayer insulating film and the second interlayer insulating film and reach the drain regions of the thin film transistors, and form holes in formation regions of the etching stop layer, for cutting the short-circuit wiring;

forming pixel electrodes electrically connected to the drain regions through the drain contact holes;

15 forming a mask pattern having holes on the second interlayer insulating film and wet-etching the second interlayer insulating film to expose surfaces of the terminals and removing a native oxide film formed on the short-circuit wiring through the holes; and

cutting the short-circuit wiring by etching through the holes.

18. The method of manufacturing a liquid crystal device substrate according to claim 17, each of the semiconductor active film of each of the thin film transistors and the silicon film, which constitutes the etching stop layer, comprising a single crystal silicon film, and a bonding SOI substrate is used as a raw material substrate.

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